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EXAMINER

MARCELO, MELVIN C

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/658,679	Applicant(s) SHEA, MICHAEL JOHN	
	Examiner Melvin Marcelo	Art Unit 2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Arguments

1. Applicant's arguments filed 8-15-2008 have been fully considered but they are not persuasive.

With respect to claims 15, 43 and 46, applicant argues that their "port adapter is included... in the Fibre Channel network" as one of the alternatives. This is clearly taught in Tan et al. (US 2003/0126315 A1) paragraph 0017 where the host bus adapter is a Fibre Channel HBA with failover firmware and paragraph 0020 where the host bus adapter is associated with a Fibre port.

With respect to the added limitation of "verifying by a storage device," this feature is an obvious modification of Tan's host/controller failover mechanism (Figure 4) in view of the teachings of Sicola et al. (US 6601187 B1) wherein the failover mechanism is performed at the array controller (column 13, line 44 to column 14, line 15) rather than at the host/controller (column 2, lines 21-35).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 15, 26, 27, 43 and 46 are rejected under 35 U.S.C. 102(e) as being anticipated by Tan et al. (Us 2003/0126315 A1).

Tan teaches the host bus adapter is a Fibre Channel HBA which is part of the Fibre Channel network (paragraph 0017) and associated with a Fibre port (paragraph 0020).

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With respect to the claims below, references to the prior art appear in parenthesis.

Claims

15. *A port adapter for providing a redundant Fibre Channel path (Tan teaches a redundant Fibre Channel path 304 and 308 in Figure 3 and paragraph 0035, wherein the Host Bus Adapter 130 is Fibre Channel (paragraph 0017) and the Interconnect 310 is a Fibre Channel loop with switches (paragraphs 0022 and 0031)), comprising:*

a port coupled to a Fibre Channel network (I/O Ports 204 and 208 coupled to Interconnect 310 in Figure 3 and Fibre port in paragraph 0020), and

a processor (Host Cpu 124 associated with Host Bus Adapter 130 shown in Figures 1 and 2), coupled to the port, the processor configured for detecting a connection change in a Fibre Channel network (Monitor Redundant Storage Controllers and Communication Fabric 410 and Detect Potential Failover Condition 420 in Figure 4) and verifying the port has a path to a connection associated with the connection change (Condition in Failover Rule Set 430 and Proper Failover Circumstances 440 in Figure 4 verifies the standby path in case of failover when the path is needed (paragraphs 0032, 0035, 0037 and 0038)), wherein the port adapter is included in a storage device or in the Fibre Channel network (Host Bus Adapter is in the Fibre Channel network since it is a Fibre Channel HBA in paragraph 0017).

26. *The port adapter of claim 15, wherein the processor verifies the port has a path to a connection associated with the connection change by periodically verifying the port has a path to a connection associated with the connection change (Path monitoring time interval in paragraph 0035).*

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27. *The port adapter of claim 15, wherein the processor provides a warning of lack of redundancy when the port does not have a path to a connection associated with the connection change* **(Transmit failover or warning flag in Figure 4 and paragraph 0038).**

43. *A program storage device readable by a processor, the program storage device tangibly embodying one or more programs of instructions executable by the processor to perform a method for providing a redundant Fibre Channel path* **(Tan teaches a redundant Fibre Channel path 304 and 308 in Figure 3 and paragraph 0035, wherein the Host Bus Adapter 130 is Fibre Channel (paragraph 0017) and the Interconnect 310 is a Fibre Channel loop with switches (paragraphs 0022 and 0031)), the method comprising:**

detecting a connection change in a Fibre Channel network **(Monitor Redundant Storage Controllers and Communication Fabric 410 and Detect Potential Failover Condition 420 in Figure 4); and**

verifying a backup device has a path to a connection associated with the connection change **(Condition in Failover Rule Set 430 and Proper Failover Circumstances 440 in Figure 4 verifies the standby path in case of failover when the path is needed (paragraphs 0032, 0035, 0037 and 0038)), wherein the processor is included in the storage device or in the Fibre Channel network (Host Bus Adapter is in the Fibre Channel network since it is a Fibre Channel HBA in paragraph 0017).**

46. *A device for providing a redundant Fibre Channel path* **(Tan teaches a redundant Fibre Channel path 304 and 308 in Figure 3 and paragraph 0035, wherein the Host Bus**

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Adapter 130 is Fibre Channel (paragraph 0017) and the Interconnect 310 is a Fibre Channel loop with switches (paragraphs 0022 and 0031)), comprising:

means, within a storage node or a Fibre Channel network (Host Bus Adapter is in the Fibre Channel network since it is a Fibre Channel HBA in paragraph 0017), for providing a port to the Fibre Channel network (I/O Ports 204 and 208 coupled to Interconnect 310 in Figure 3), and

means, within the storage node or the Fibre Channel network (Host Bus Adapter is in the Fibre Channel network since it is a Fibre Channel HBA in paragraph 0017), for processing (Host Cpu 124) coupled to the means for providing a port, the means for processing detecting a connection change in a Fibre Channel network (Monitor Redundant Storage Controllers and Communication Fabric 410 and Detect Potential Failover Condition 420 in Figure 4) and verifying the means for providing a port has a path to a connection associated with the connection change (Condition in Failover Rule Set 430 and Proper Failover Circumstances 440 in Figure 4 verifies the standby path in case of failover when the path is needed (paragraphs 0032, 0035, 0037 and 0038)).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 16-19, 24, 28 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tan et al.

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Tan teaches detecting potential failover conditions which includes event notification over the communication fabric which would potentially affect the operating status of the active and standby communication paths (paragraph 0037). Tan does not specifically mention a state change notification indicating a device has been added, removed or failed in the Fibre Channel network. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide such a state change notification for the reason that the state change notification is an event notification over the communication fabric that provides notice of a potential failover condition.

Also, Tan does not teach a name table by the backup device or Topology Database. However, it would have been obvious to provide the name table and Topology Database for the reason that Tan must provide path verification for redundant devices wherein the devices must each have a name identifier in order to distinguish different devices and the paths must be stored in a database in order to determine the redundant path from other paths.

Furthermore, Tan does not teach taking corrective action in response to the failover/warning flag in paragraph 0038. However, it would have been obvious to take corrective action when the failover/warning flag is received since the purpose of Tan's invention is to make sure that the standby (i.e. redundant) path is available or "safe" to failover when the path is needed (paragraph 0035).

Claims

16. The port adapter of claim 15, wherein the processor detects a connection change in response to a state change notification indicating a device has been added to the Fibre Channel network (Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037) where adding a device would have been an obvious event).

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17. *The port adapter of claim 15, wherein the processor detects a connection change in response to a state change notification indicating a device has been removed from the Fibre Channel network* (**Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037) where removing a device would have been an obvious event).**

18. *The port adapter of claim 15, wherein the processor detects a connection change in response to a state change notification indicating a device has failed and severed a connection to the Fibre Channel network* (**Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037) where device failure would have been an obvious event).**

19. *The port adapter of claim 15, wherein the processor verifies the port has a path to a connection associated with the connection change by querying a name table to determine whether the port is coupled via a redundant path to the connection associated with the connection change* (**Obvious to provide a name table in order to distinguish the redundant device from other devices such as the redundant controller in paragraph 0035).**

24. *The port adapter of claim 15, wherein the processor verifies the port has a path to a connection associated with the connection change by querying a Topology Database to determine whether the port is coupled via a redundant path to the connection associated with the connection change* (**Obvious to provide a Topology Database in order to determine the**

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redundant/standby paths of redundant devices such as the redundant controller in paragraph 0035).

28. The port adapter of claim 27, wherein the processor takes corrective action in response to the warning of lack of redundancy (Obvious in order to make sure standby paths are available or “safe” to failover when the path is needed (paragraph 0035)).

44. The program storage device of claim 43, wherein the verifying further comprises querying a name table by the backup device to determine whether the backup device has a redundant path to the connection associated with the connection change (Obvious to provide a name table in order to distinguish the redundant device from other devices such as the redundant controller in paragraph 0035).

6. Claims 20-23, 25 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tan et al. in view of applicant's admitted prior art.

Tan teaches the use of the Fibre Channel Protocol (paragraph 0017), but does not teach the particulars of the Fibre Channel standard. Applicant's invention is directed to the Fibre Channel Protocol and recites particular features of the Fibre Channel Standard such as the Fibre Channel Arbitrated Loop (specification , page 3, lines 7-10), World Wide Port Name and World Wide Node Name (page 5, lines 1-5). Therefore, it would have been obvious to provide the features of the Fibre Channel standard into Tan since Tan is explicitly directed to the Fiber Channel Protocol.

With respect to the claims below, references to the prior art appear in parenthesis.

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Claims

20. *The port adapter of claim 15, wherein a World Wide Name and World Wide Port Name associated with the connection change is changed to be associated with the port to provide a redundant path to the connection associated with the connection change* **(Obvious to incorporate admitted World Wide Name and World Wide Port Name features of the Fiber Channel standard to the Fibre Channel Protocol system of Tan).**

21. *The port adapter of claim 15, wherein the processor detects a connection change in response to a Loop Initialization Primitive indicating a device has been added to an Arbitrated Loop* **(Loop Initialization Primitive is assumed to be feature of the Fibre Channel Arbitrated Loop standard).**

22. *The port adapter of claim 15, wherein the processor detects a connection change in response to a Loop Initialization Primitive indicating a device has been removed from an Arbitrated Loop* **(Loop Initialization Primitive is assumed to be feature of the Fibre Channel Arbitrated Loop standard).**

23. *The port adapter of claim 15, wherein the processor detects a connection change in response to a Loop Initialization Primitive indicating a device has failed and severed a connection to an Arbitrated Loop* **(Loop Initialization Primitive is assumed to be feature of the Fibre Channel Arbitrated Loop standard).**

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25. *The port adapter of claim 15 further comprising an Arbitrated Loop Physical Address associated with the connection change, wherein the Arbitrated Loop Physical Address associated with the connection change is changed to be associated with the port to provide a redundant path to the connection associated with the connection change* **(Arbitrated Loop Physical Address is assumed to be feature of the Fibre Channel Arbitrated Loop standard).**

45. *The program storage device of claim 43 further comprising moving a World Wide Name and World Wide Port Name associated with the connection change to the backup device to provide a redundant path to the connection associated with the connection change* **(Obvious to incorporate admitted World Wide Name and World Wide Port Name features of the Fiber Channel standard to the Fibre Channel Protocol system of Tan).**

7. Claims 1-5, 10, 12-14, 29-33, 35, 39, 41-42, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tan et al. in view of Sicola et al. (US 6,601,187 B1). Note that the alternative embodiment of claims 15-19, 24 and 26-28, 43 and 46 are also obvious over the combination of Tan et al. and Sicola et al.

Tan teaches that the failover mechanism (Figure 3) is performed in the Host Bus Adapter 130 in conjunction with redundant storage controllers 324, 330 wherein the redundant storage controllers are array controllers (paragraph 0011). Tan does not teach that the failover mechanism is performed by a storage node. However, Tan teaches that their detailed redundancy environment can be applied to many different redundancy environments including SCSI parallel bus (paragraph 0017). Sicola provides an explicit teaching of modifying a host

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and controller failover mechanism in order to comply with the SCSI standard (column 2, lines 21-37), wherein their failover mechanism is performed by the array controllers (Figure 9 and column 13, line 44 to column 14, line 15) and a pair of array controllers are called a storage node (column 8, lines 20-23). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tan such that the Tan's failover mechanism is performed by the array controllers in order to comply with the SCSI standard as explicitly taught by Sicola.

With respect to the claims below, references to the prior art appear in parenthesis.

Claims

1. *A method for providing a redundant Fibre Channel path (Tan teaches a redundant Fibre Channel path 304 and 308 in Figure 3 and paragraph 0035, wherein the Host Bus Adapter 130 is Fibre Channel (paragraph 0017) and the Interconnect 310 is a Fibre Channel loop with switches (paragraphs 0022 and 0031)), comprising:*

detecting a connection change in a Fibre Channel network (Monitor Redundant Storage Controllers and Communication Fabric 410 and Detect Potential Failover Condition 420 in Figure 4); and

verifying by a storage device that the storage device (HBA failover mechanism in Tan modified for use in the storage device/pair of controllers in Sicola's Figure 9) has a path to a connection associated with the connection change (Condition in Failover Rule Set 430 and Proper Failover Circumstances 440 in Figure 4 verifies the standby path in case of failover when the path is needed (paragraphs 0032, 0035, 0037 and 0038)) .

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2. *The method of claim 1, wherein the detecting a connection change further comprises issuing a state change notification indicating a device has been added to the Fibre Channel network* **(Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037)).**

3. *The method of claim 1, wherein the detecting a connection change further comprises issuing a state change notification indicating a device has been removed from the Fibre Channel network* **(Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037)) .**

4. *The method of claim 1, wherein the detecting a connection change further comprises issuing a state change notification indicating a device has failed and severed a connection to the Fibre Channel network* **(Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037)).**

5. *The method of claim 1, wherein the verifying further comprises querying a name table by the storage device to determine whether the storage device* **(Storage devices/controllers in Sicola's Figure 9)** *has a redundant path to the connection associated with the connection change* **(Obvious to provide a name table in order to distinguish the redundant device from other devices such as the redundant controller in paragraph 0035).**

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10. The method of claim 1, wherein the verifying further comprises querying a Topology Database to determine whether the storage device (**Sicola's storage device/controllers in Figure 9**) has a redundant path to the connection associated with the connection change (**Obvious to provide a Topology Database in order to determine the redundant/standby paths of redundant devices such as the redundant controller in paragraph 0035**).

12. The method of claim 1, wherein the verifying further comprises periodically verifying that the storage device (**Sicola's storage device/controllers in Figure 9**) has a path to a connection associated with the connection change (**Path monitoring time interval in paragraph 0035**).

13. The method of claim 1, wherein the verifying further comprises providing a warning of lack of redundancy when the storage (**Sicola's storage device/controllers in Figure 9**) device does not have a path to a connection associated with the connection change (**Transmit failover or warning flag in Figure 4 and paragraph 0038**) .

14. The method of claim 13, wherein the verifying further comprises taking corrective action in response to the warning of lack of redundancy (**Obvious in order to make sure standby paths are available or "safe" to failover when the path is needed (paragraph 0035)**).

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15. A port adapter for providing a redundant Fibre Channel path (**Tan teaches a redundant Fibre Channel path 304 and 308 in Figure 3 and paragraph 0035, wherein the Host Bus Adapter 130 is Fibre Channel (paragraph 0017) and the Interconnect 310 is a Fibre Channel loop with switches (paragraphs 0022 and 0031)), comprising:**

a port coupled to a Fibre Channel network (I/O Ports 204 and 208 coupled to Interconnect 310 in Figure 3), and

a processor (Host Cpu 124 associated with Host Bus Adapter 130 shown in Figures 1 and 2), coupled to the port, the processor configured for detecting a connection change in a Fibre Channel network (Monitor Redundant Storage Controllers and Communication Fabric 410 and Detect Potential Failover Condition 420 in Figure 4) and verifying the port has a path to a connection associated with the connection change (Condition in Failover Rule Set 430 and Proper Failover Circumstances 440 in Figure 4 verifies the standby path in case of failover when the path is needed (paragraphs 0032, 0035, 0037 and 0038)), wherein the port adapter is included in a storage device (HBA failover mechanism in Tan modified for use in the storage device/pair of controllers in Sicola's Figure 9) or in the Fibre Channel network.

16. The port adapter of claim 15, wherein the processor detects a connection change in response to a state change notification indicating a device has been added to the Fibre Channel network (**Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037)).**

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17. *The port adapter of claim 15, wherein the processor detects a connection change in response to a state change notification indicating a device has been removed from the Fibre Channel network* **(Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037)).**

18. *The port adapter of claim 15, wherein the processor detects a connection change in response to a state change notification indicating a device has failed and severed a connection to the Fibre Channel network* **(Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037)).**

19. *The port adapter of claim 15, wherein the processor verifies the port has a path to a connection associated with the connection change by querying a name table to determine whether the port is coupled via a redundant path to the connection associated with the connection change* **(Obvious to provide a name table in order to distinguish the redundant device from other devices such as the redundant controller in paragraph 0035).**

24. *The port adapter of claim 15, wherein the processor verifies the port has a path to a connection associated with the connection change by querying a Topology Database to determine whether the port is coupled via a redundant path to the connection associated with the connection change* **(Obvious to provide a Topology Database in order to determine the redundant/standby paths of redundant devices such as the redundant controller in paragraph 0035).**

26. The port adapter of claim 15, wherein the processor verifies the port has a path to a connection associated with the connection change by periodically verifying the port has a path to a connection associated with the connection change (**Path monitoring time interval in paragraph 0035**).

27. The port adapter of claim 15, wherein the processor provides a warning of lack of redundancy when the port does not have a path to a connection associated with the connection change (**Transmit failover or warning flag in Figure 4 and paragraph 0038**).

28. The port adapter of claim 27, wherein the processor takes corrective action in response to the warning of lack of redundancy (**Obvious in order to make sure standby paths are available or “safe” to failover when the path is needed (paragraph 0035)**).

29. A network providing a redundant Fibre Channel path (**Tan teaches a redundant Fibre Channel path 304 and 308 in Figure 3 and paragraph 0035, wherein the Host Bus Adapter 130 is Fibre Channel (paragraph 0017) and the Interconnect 310 is a Fibre Channel loop with switches (paragraphs 0022 and 0031)), comprising:**

a local node within a storage device (HBA failover mechanism in Tan modified for use in the storage device/pair of controllers in Sicola's Figure 9); and

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*a Fibre Channel network coupling the local node and the remote node (**Communication Fabric 140 in Figure 1**),*

*wherein at least one of the local node and the Fibre Channel network includes a first physical interface (**I/O Port 204 in Figure 3**) and a backup physical interface (**I/O Port 208 in Figure 3**), wherein the backup physical interface further comprises:*

*a port coupled to a Fibre Channel network (**I/O Port 208 to Interconnect 310 in Figure 3**), and*

*a processor (**Host Cpu 124**), coupled to the port, the processor configured for detecting a connection change in a Fibre Channel network (**Monitor Redundant Storage Controllers and Communication Fabric 410 and Detect Potential Failover Condition 420 in Figure 4**) and verifying the backup physical interface has a path to a connection associated with the connection change (**Condition in Failover Rule Set 430 and Proper Failover Circumstances 440 in Figure 4** verifies the standby path in case of failover when the path is needed (paragraphs 0032, 0035, 0037 and 0038)).*

*30. The network of claim 29, wherein the processor detects a connection change in response to a state change notification indicating a device has been added to the Fibre Channel network (**Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037)**)).*

31. The network of claim 29, wherein the processor detects a connection change in response to a state change notification indicating the first physical interface has been removed

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from the Fibre Channel network **(Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037)).**

32. *The network of claim 29, wherein the processor detects a connection change in response to a state change notification indicating the first physical interface has failed and severed a connection to the Fibre Channel network* **(Obvious since Tan teaches an event notification that notifies of potential failover conditions (paragraph 0037)).**

33. *The network of claim 29, wherein the processor verifies the backup physical interface has a path to a connection associated with the connection change by querying a name table to determine whether the backup physical interface is coupled via a redundant path to the connection associated with the connection change* **(Obvious to provide a name table in order to distinguish the redundant device from other devices such as the redundant controller in paragraph 0035).**

35. *The network of claim 29, wherein the processor verifies the backup physical interface has a path to a connection associated with the connection change by periodically verifying the backup physical interface has a path to a connection associated with the connection change* **(Path monitoring time interval in paragraph 0035).**

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39. *The network of claim 29, wherein the processor verifies the port has a path to a connection associated with the connection change by querying a Topology Database to determine whether the port is coupled via a redundant path to the connection associated with the connection change* **(Obvious to provide a Topology Database in order to determine the redundant/standby paths of redundant devices such as the redundant controller in paragraph 0035).**

41. *The network of claim 29, wherein the processor provides a warning of lack of redundancy when the backup physical interface does not have a path to a connection associated with the connection change* **(Transmit failover or warning flag in Figure 4 and paragraph 0038).**

42. *The network of claim 41, wherein the processor takes corrective action in response to the warning of lack of redundancy* **(Obvious in order to make sure standby paths are available or “safe” to failover when the path is needed (paragraph 0035)).**

43. *A program storage device readable by a computer, the program storage device tangibly embodying one or more programs of instructions executable by the computer to perform a method for providing a redundant Fibre Channel path* **(Tan teaches a redundant Fibre Channel path 304 and 308 in Figure 3 and paragraph 0035, wherein the Host Bus Adapter 130 is Fibre Channel (paragraph 0017) and the Interconnect 310 is a Fibre Channel loop with switches (paragraphs 0022 and 0031)), the method comprising:**

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detecting a connection change in a Fibre Channel network (Monitor Redundant Storage Controllers and Communication Fabric 410 and Detect Potential Failover Condition 420 in Figure 4); and

verifying a backup device has a path to a connection associated with the connection change (Condition in Failover Rule Set 430 and Proper Failover Circumstances 440 in Figure 4 verifies the standby path in case of failover when the path is needed (paragraphs 0032, 0035, 0037 and 0038))., wherein the processor is included in the storage device (HBA failover mechanism in Tan modified for use in the storage device/pair of controllers in Sicola's Figure 9) or in the Fibre Channel network.

46. A device for providing a redundant Fibre Channel path (Tan teaches a redundant Fibre Channel path 304 and 308 in Figure 3 and paragraph 0035, wherein the Host Bus Adapter 130 is Fibre Channel (paragraph 0017) and the Interconnect 310 is a Fibre Channel loop with switches (paragraphs 0022 and 0031)), comprising:

Means, within a storage node (HBA failover mechanism in Tan modified for use in the storage device/pair of controllers in Sicola's Figure 9) or a Fibre Channel network, for providing a port to the Fibre Channel network (I/O Ports 204 and 208 coupled to Interconnect 310 in Figure 3), and

means, within the storage node (HBA failover mechanism in Tan modified for use in the storage device/pair of controllers in Sicola's Figure 9) of the Fibre Channel network, for processing (Host Cpu 124) coupled to the means for providing a port, the means for processing detecting a connection change in a Fibre Channel network (Monitor Redundant

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Storage Controllers and Communication Fabric 410 and Detect Potential Failover Condition 420 in Figure 4) and verifying the means for providing a port has a path to a connection associated with the connection change (**Condition in Failover Rule Set 430 and Proper Failover Circumstances 440 in Figure 4** verifies the standby path in case of failover when the path is needed (paragraphs 0032, 0035, 0037 and 0038)).

47. A network providing a redundant Fibre Channel path (**Tan teaches a redundant Fibre Channel path 304 and 308 in Figure 3 and paragraph 0035, wherein the Host Bus Adapter 130 is Fibre Channel (paragraph 0017) and the Interconnect 310 is a Fibre Channel loop with switches (paragraphs 0022 and 0031)), comprising:**

a local node (Host Server 120 associated with Host Bus Adapter 130 in Figure 1);

a remote node (Storage System 170/180 in Figure 1); and

a Fibre Channel network coupling the local node and the remote node (Communication Fabric 140 in Figure 1),

wherein at least one of the local node, remote node and Fibre Channel network includes a first means for providing a physical interface (I/O Port 204 in Figure 3) and a second means for providing a backup physical interface (I/O Port 208 in Figure 3), wherein the second means further comprises:

means for providing a port to a Fibre Channel network (I/O Port 208 to Interconnect 310 in Figure 3), and

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means for processing (Host Cpu 124) coupled to the means for providing a port, the means for processing detecting a connection change in a Fibre Channel network (Monitor Redundant Storage Controllers and Communication Fabric 410 and Detect Potential Failover Condition 420 in Figure 4) and verifying the backup physical interface has a path to a connection associated with the connection change (Condition in Failover Rule Set 430 and Proper Failover Circumstances 440 in Figure 4 verifies the standby path in case of failover when the path is needed (paragraphs 0032, 0035, 0037 and 0038)).

47. A network providing a redundant Fibre Channel path (Tan teaches a redundant Fibre Channel path 304 and 308 in Figure 3 and paragraph 0035, wherein the Host Bus Adapter 130 is Fibre Channel (paragraph 0017) and the Interconnect 310 is a Fibre Channel loop with switches (paragraphs 0022 and 0031)), comprising:

a local node (Host Server 120 associated with Host Bus Adapter 130 in Figure 1);

a remote node (Storage System 170/180 in Figure 1); and

a Fibre Channel network coupling the local node and the remote node (Communication Fabric 140 in Figure 1),

wherein at least one of the local node, remote node and Fibre Channel network includes a first means for providing a physical interface (I/O Port 204 in Figure 3) and a second means for providing a backup physical interface (I/O Port 208 in Figure 3), wherein the second means further comprises:

means for providing a port to a Fibre Channel network (I/O Port 208 to Interconnect 310 in Figure 3), and

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means for processing (Host Cpu 124) coupled to the means for providing a port, the means for processing detecting a connection change in a Fibre Channel network (Monitor Redundant Storage Controllers and Communication Fabric 410 and Detect Potential Failover Condition 420 in Figure 4) and verifying the backup physical interface has a path to a connection associated with the connection change (Condition in Failover Rule Set 430 and Proper Failover Circumstances 440 in Figure 4 verifies the standby path in case of failover when the path is needed (paragraphs 0032, 0035, 0037 and 0038)).

8. Claims 6-9, 11, 34, 36-38 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tan et al. and Sicola et al. as applied to claims above, and further in view of applicant's admitted prior art.

Tan teaches the use of the Fibre Channel Protocol (paragraph 0017), but does not teach the particulars of the Fibre Channel standard. Applicant's invention is directed to the Fibre Channel Protocol and recites particular features of the Fibre Channel Standard such as the Fibre Channel Arbitrated Loop (specification , page 3, lines 7-10), World Wide Port Name and World Wide Node Name (page 5, lines 1-5). Therefore, it would have been obvious to provide the features of the Fibre Channel standard into Tan since Tan is explicitly directed to the Fiber Channel Protocol.

Claims

6. The method of claim 1 further comprising moving a World Wide Name and World Wide Port Name associated with the connection change to the storage device to provide a redundant path to the connection associated with the connection change (Obvious to incorporate admitted World Wide Name and World Wide Port Name features of the Fiber Channel standard to the Fibre Channel Protocol system of Tan).

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7. *The method of claim 1, wherein the detecting a connection change further comprises receiving an indication from a Loop Initialization Primitive indicating a device has been added to an Arbitrated Loop (Loop Initialization Primitive is assumed to be feature of the Fibre Channel Arbitrated Loop standard).*

8. *The method of claim 1, wherein the detecting a connection change further comprises receiving an indication from a Loop Initialization Primitive indicating a device has been removed from an Arbitrated Loop (Loop Initialization Primitive is assumed to be feature of the Fibre Channel Arbitrated Loop standard).*

9. *The method of claim 1, wherein the detecting a connection change further comprises receiving an indication from a Loop Initialization Primitive indicating a device has failed and severed a connection to an Arbitrated Loop (Loop Initialization Primitive is assumed to be feature of the Fibre Channel Arbitrated Loop standard).*

11. *The method of claim 1 further comprising moving an Arbitrated Loop Physical Address associated with the connection change to the storage device to provide a redundant path to a connection associated with the connection change (Arbitrated Loop Physical Address is assumed to be feature of the Fibre Channel Arbitrated Loop standard).*

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34. *The network of claim 29, wherein a World Wide Name and World Wide Port Name associated with the connection change is changed to be associated with the backup physical interface to provide a redundant path to the connection associated with the connection change*
(Obvious to incorporate admitted World Wide Name and World Wide Port Name features of the Fiber Channel standard to the Fibre Channel Protocol system of Tan).

36. *The network of claim 29, wherein the processor detects a connection change in response to a Loop Initialization Primitive indicating a device has been added to an Arbitrated Loop*
(Loop Initialization Primitive is assumed to be feature of the Fibre Channel Arbitrated Loop standard).

37. *The network of claim 29, wherein the processor detects a connection change in response to a Loop Initialization Primitive indicating a device has been removed from an Arbitrated Loop*
(Loop Initialization Primitive is assumed to be feature of the Fibre Channel Arbitrated Loop standard).

38. *The network of claim 29, wherein the processor detects a connection change in response to a Loop Initialization Primitive indicating a device has failed and severed a connection to an Arbitrated Loop*
(Loop Initialization Primitive is assumed to be feature of the Fibre Channel Arbitrated Loop standard).

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40. The network of claim 29 further comprising an Arbitrated Loop Physical Address associated with the connection change, wherein the Arbitrated Loop Physical Address associated with the connection change is changed to be associated with the port to provide a redundant path to the connection associated with the connection change (Arbitrated Loop Physical Address is assumed to be feature of the Fibre Channel Arbitrated Loop standard).

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melvin Marcelo whose telephone number is 571-272-3125. The examiner can normally be reached on Mon-Fri 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Firmin Backer can be reached on 571-272-6703. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Melvin Marcelo/
Primary Examiner
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December 22, 2008